

Please **CANCEL** claim 30.

Please **AMEND** the claims as follows:

1. (Previously Amended) A method of implementing storage virtualization in a storage area network, the method comprising:
  - creating a virtual enclosure, the virtual enclosure having one or more virtual ports and being adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network;
  - associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network, thereby enabling one or more network devices within the storage area network to be associated with the virtual ports; and
  - assigning an address or identifier to each of the virtual ports;
  - wherein associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network includes sending a message from a first network device to a physical port of a second network device within the storage area network to instruct the physical port of the second network device to handle messages addressed to the address or identifier assigned to the associated virtual port, thereby enabling the first network device to instruct the physical port of the second network device to act on behalf of the virtual port.
2. (Cancelled)
3. (Previously Amended) The network device as recited in claim 18, wherein the

storage area network is a virtual storage area network.

4. (Previously Amended) The network device as recited in claim 18, wherein a Node World Wide Name is associated with the virtual enclosure.
5. (Previously Amended) The network device as recited in claim 18 wherein a Port World Wide Name is assigned to each of the virtual ports such that the Port World Wide Name is associated with an associated physical port of a network device within the storage area network.
6. (Previously Amended) The network device as recited in claim 18, wherein the physical port of the second network device within the storage area network is a port of a fibre channel device.
7. (Previously Amended) The network device as recited in claim 18, wherein an FCID is assigned to each of the virtual ports.
8. (Currently Amended) The method as recited in claim 1, further comprising:  
selecting a number of virtual ports to be included in the virtual enclosure.
9. (Previously Amended) The network device as recited in claim 18, wherein the number of virtual ports of the virtual enclosure is greater than a number of ports of each network device within the storage area network.
10. (Previously Amended) The method as recited in claim 1, wherein associating

each of the virtual ports of the virtual enclosure with a port of a second network device within the storage area network comprises:

associating the virtual ports with ports of one or more network devices within the storage area network.

11. (Previously Amended) The network device as recited in claim 18, wherein associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network comprises:

sending a bind message to a port of a network device within the storage area network, thereby binding the port of a network device within the storage area network to one or more of the virtual ports.

12. (Previously Amended) The network device as recited in claim 11, further comprising:

sending a trap message to one or more additional ports of one or more network devices within the storage area network, thereby instructing the one or more additional ports of one or more network devices within the storage area network to trap messages directed to one of the virtual ports.

13. (Previously Amended) The network device as recited in claim 18, wherein one or more of the virtual storage units each comprises a VLUN or other virtual representation of storage on the storage area network.

14. (Original) The method as recited in claim 1, further comprising:  
assigning one or more virtual storage units to the virtual enclosure.

15. (Original) The method as recited in claim 14, wherein the one or more virtual storage units each comprise a VLUN or other virtual representation of storage on the storage area network.

16. (Previously Amended) A computer-readable medium storing thereon computer-readable instructions for implementing storage virtualization in a storage area network, comprising:

instructions for creating a virtual enclosure, the virtual enclosure having one or more virtual ports and adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network;

instructions for associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network, thereby enabling one or more network devices within the storage area network to be associated with the virtual ports; and

instructions for assigning an address or identifier to each of the virtual ports;

wherein the instructions for associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network includes instructions for sending a message from a first network device to a physical port of a second network device within the storage area network to instruct the physical port of the second network device to handle messages addressed to the address or identifier assigned to the associated virtual port, thereby enabling the first network device to instruct the physical port of the second network device to act on behalf of the virtual port.

17. (Previously Amended) An apparatus for implementing storage virtualization in a storage area network, comprising:

means for creating a virtual enclosure, the virtual enclosure having one or more virtual ports and adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network;

means for associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network, thereby enabling one or more network devices within the storage area network to be associated with the virtual ports; and

means for assigning an address or identifier to each of the virtual ports;

wherein the means for associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network includes means for sending a message from a first network device to a physical port of a second network device within the storage area network to instruct the physical port of the second network device to handle messages addressed to the address or identifier assigned to the associated virtual port, thereby enabling the first network device to instruct the physical port of the second network device to act on behalf of the virtual port.

18. (Previously Amended) A network device adapted for implementing storage virtualization in a storage area network, comprising:

a processor; and

a memory, at least one of the processor and the memory being adapted for:

creating a virtual enclosure, the virtual enclosure having one or more virtual ports and adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of

the storage area network;

associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network, thereby enabling one or more network devices within the storage area network to be associated with the virtual ports; and

assigning an address or identifier to each of the virtual ports;

wherein associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network includes sending a message from a first network device to a physical port of a second network device within the storage area network to instruct the physical port of the second network device to handle messages addressed to the address or identifier assigned to the associated virtual port, thereby enabling the first network device to instruct the physical port of the second network device to act on behalf of the virtual port.

19. (Previously Amended) A method of performing LUN mapping in a storage area network, the method comprising:

accessing a LUN mapping table having one or more entries, each of the entries identifying an initiator in the storage area network, one or more of a set of one or more virtual ports of a virtual enclosure, and associating a specified logical unit with one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein the virtual enclosure is adapted for representing the set of one or more virtual storage units and each of the virtual ports is associated with a physical port of a network device within the storage area network, wherein the physical port of the network device has received a message from another network device instructing the physical port to handle messages addressed to the associated virtual port; and

when a request for the specified logical unit is received from the initiator via one of the associated virtual ports, identifying one of the entries in the LUN mapping table and employing the one or more virtual storage units specified in the entry to service the request.

20. (Previously Amended) A computer-readable medium storing thereon instructions for performing LUN mapping in a storage area network, comprising:

instructions for accessing a LUN mapping table having one or more entries, each of the entries identifying an initiator in the storage area network, one or more of a set of one or more virtual ports of a virtual enclosure, and associating a specified logical unit with one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein the virtual enclosure is adapted for representing the set of one or more virtual storage units and each of the virtual ports is associated with a physical port of a network device within the storage area network, wherein the physical port of the network device has received a message from another network device instructing the physical port to handle messages addressed to the associated virtual port; and

instructions for identifying one of the entries in the LUN mapping table and employing the one or more virtual storage units specified in the entry to service the request when a request for the specified logical unit is received from the initiator via one of the associated virtual ports.

21. (Currently Amended) In a first network device, a method of implementing storage virtualization in a storage area network, the method comprising:

sending a virtualization message to a physical port of a second network device within the storage area network, the virtualization message instructing the physical port to handle

messages addressed to a virtual port of a virtual enclosure, the virtual enclosure having one or more virtual ports and being adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein the virtualization message indicates that the physical port is to handle messages addressed to an address or identifier assigned to the virtual port and

receiving a virtualization response from the physical port of the second network device in response to the virtualization message.

22. (Previously Amended) The apparatus as recited in claim 34, wherein the virtual port is identified by a NWWN and a PWWN.

23. (Previously Amended) The apparatus as recited in claim 34, wherein the virtualization response indicates that the physical port is configured to handle messages addressed to the virtual port of the virtual enclosure.

24. (Previously Amended) The apparatus as recited in claim 34, wherein the virtualization message indicates that the physical port is to obtain an address or identifier assigned to the virtual port.

25. (Previously Amended) The apparatus as recited in claim 24, wherein the virtualization message is a bind message or a trap message.

26. (Previously Amended) The apparatus as recited in claim 24, wherein the virtualization response comprises the address or identifier assigned to the virtual port.



27. (Previously Amended) The apparatus as recited in claim 34, wherein the virtualization message indicates that the physical port is to obtain an address or identifier assigned to the virtual port from a DNS server.
28. (Previously Amended) The method as recited in claim 21, further comprising: receiving an address or identifier assigned to the virtual port.
29. (Previously Amended) The apparatus as recited in claim 24, wherein the address or identifier is an FCID.
30. (Cancelled)
31. (Currently Amended) The apparatus as recited in claim 21 ~~30~~, wherein the address or identifier is an FCID.
32. (Previously Amended) A computer-readable medium storing thereon computer-readable instructions for implementing storage virtualization in a first network device of a storage area network, comprising:
- instructions for sending a virtualization message to a physical port of a second network device within the storage area network, the virtualization message instructing the physical port to handle messages addressed to a virtual port of a virtual enclosure, the virtual enclosure having one or more virtual ports and being adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical

storage locations on one or more physical storage units of the storage area network; and  
instructions for receiving a virtualization response from the physical port of the  
second network device in response to the virtualization message.

33. (Previously Amended) An apparatus adapted for implementing storage  
virtualization in a first network device of a storage area network, comprising:

means for sending a virtualization message to a physical port of a second network  
device within the storage area network, the virtualization message instructing the physical  
port to handle messages addressed to a virtual port of a virtual enclosure, the virtual  
enclosure having one or more virtual ports and being adapted for representing one or more  
virtual storage units, each of the virtual storage units representing one or more physical  
storage locations on one or more physical storage units of the storage area network; and

means for receiving a virtualization response from the physical port of the second  
network device in response to the virtualization message.

34. (Previously Amended) An apparatus adapted for implementing storage  
virtualization in a first network device of a storage area network, comprising:

a processor; and

a memory, at least one of the processor and the memory being adapted for:

sending a virtualization message to a physical port of a second network device within  
the storage area network, the virtualization message instructing the physical port to handle  
messages addressed to a virtual port of a virtual enclosure, the virtual enclosure having one or  
more virtual ports and being adapted for representing one or more virtual storage units, each  
of the virtual storage units representing one or more physical storage locations on one or  
more physical storage units of the storage area network; and

receiving a virtualization response from the physical port of the second network device in response to the virtualization message.

35. (Previously Amended) A method of implementing storage virtualization in a first network device of a storage area network, the method comprising:

receiving a virtualization message at a physical port of the first network device from a second network device within the storage area network, the virtualization message instructing the physical port to handle messages addressed to a virtual port of a virtual enclosure, the virtual enclosure having one or more virtual ports and being adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network; and

sending a virtualization response from the physical port of the first network device to the second network device in response to the virtualization message.

36. (Previously Amended) The network device as recited in claim 52, wherein the virtualization message indicates that the physical port is to obtain an address or identifier assigned to the virtual port.

37. (Previously Amended) The method as recited in claim 35, further comprising:

obtaining and storing the address or identifier assigned to the virtual port.

38. (Previously Amended) The network device as recited in claim 52, wherein the virtualization message indicates that the physical port is to obtain an address or identifier assigned to the virtual port from a DNS server.

39. (Previously Amended) The method as recited in claim 37, further comprising:  
sending the address or identifier assigned to the virtual port.
40. (Previously Amended) The method as recited in claim 37, wherein the address  
or identifier is an FCID.
41. (Previously Amended) The network device as recited in claim 52, wherein the  
virtualization message indicates that the physical port is to handle messages addressed to an  
address or identifier assigned to the virtual port.
42. (Previously Amended) The network device as recited in claim 41, wherein the  
address or identifier is an FCID.
43. (Previously Amended) The method as recited in claim 35, further comprising:  
handling messages addressed to the address or identifier assigned to the virtual port.
44. (Previously Amended) The method as recited in claim 35, further comprising:  
handling messages addressed to the virtual port of the virtual enclosure.
45. (Previously Amended) The method as recited in claim 37, further comprising:  
handling messages addressed to the address or identifier assigned to the virtual port.
46. (Previously Amended) The method as recited in claim 35, further comprising:  
receiving a report message requesting an identification of one or more of the virtual

storage units supported by an address or identifier assigned to one of the virtual ports;  
sending a reply message identifying one or more of the virtual storage units.

47. (Original) The method as recited in claim 46, wherein the address or identifier is an FCID.

48. (Previously Amended) The network device as recited in claim 52, wherein one or more of the virtual storage units comprises a VLUN or other virtual representation of storage on the storage area network.

49. (Original) The method as recited in claim 46, wherein the one or more of the virtual storage units identified in the reply message are those virtual storage units that are visible to an initiator sending the report message.

50. (Previously Amended) A computer-readable medium storing thereon computer readable instructions for implementing storage virtualization in a first network device of a storage area network, comprising:

instructions for receiving a virtualization message at a physical port of the first network device from a second network device within the storage area network, the virtualization message instructing the physical port to handle messages addressed to a virtual port of a virtual enclosure, the virtual enclosure having one or more virtual ports and being adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network; and

instructions sending a virtualization response from the physical port of the first

network device to the second network device in response to the virtualization message.

51. (Previously Amended) A network device adapted for implementing storage virtualization in a first network device of a storage area network, comprising:

means for receiving a virtualization message at a physical port of the first network device from a second network device within the storage area network, the virtualization message instructing the physical port to handle messages addressed to a virtual port of a virtual enclosure, the virtual enclosure having one or more virtual ports and being adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network; and

means for sending a virtualization response from the physical port of the first network device to the second network device in response to the virtualization message.

52. (Previously Amended) A network device adapted for implementing storage virtualization in a first network device of a storage area network, comprising:

a processor; and

a memory, at least one of the processor and the memory being adapted for:

receiving a virtualization message at a physical port of the first network device from a second network device within the storage area network, the virtualization message instructing the physical port to handle messages addressed to a virtual port of a virtual enclosure, the virtual enclosure having one or more virtual ports and being adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network; and

sending a virtualization response from the physical port of the first network device to

the second network device in response to the virtualization message.